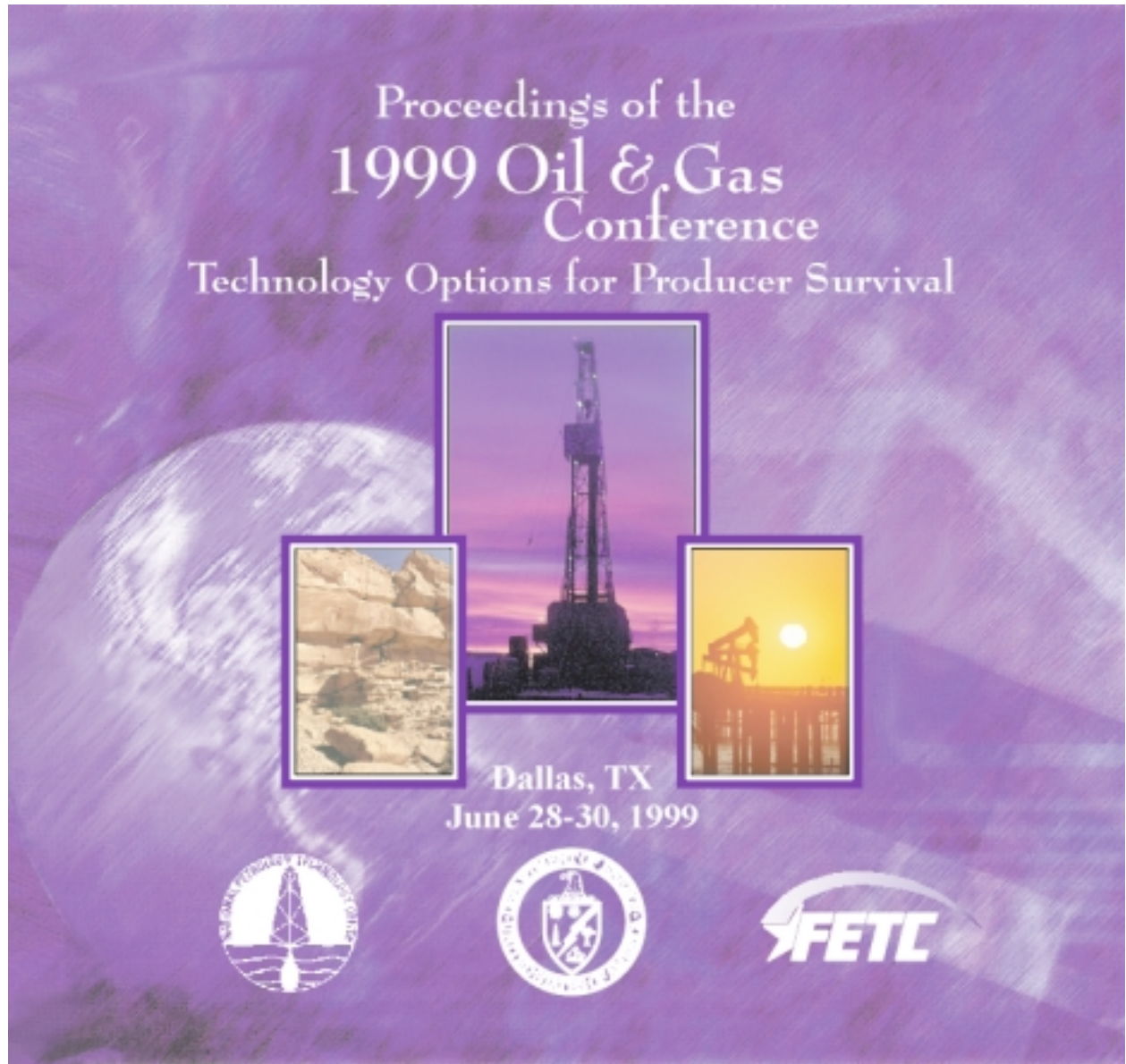


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Foreword

The 1999 Oil & Gas Conference was cosponsored by the U.S. Department of Energy (DOE), Office of Fossil Energy, Federal Energy Technology Center (FETC) and National Petroleum Technology Office (NPTO) on June 28 to 30 in Dallas, Texas.

DOE sponsors technology research and development for the oil and natural gas industries. Periodically, DOE presents the results of this research in a conference format to provide technology transfer to interested parties and to keep the public informed. The Oil & Gas Conference theme, *Technology Options for Producer Survival*, reflects the need for development and implementation of new technologies to ensure an affordable, reliable energy future.

The conference was attended by nearly 250 representatives from industry, academia, national laboratories, DOE, and other Government agencies. Three preconference workshops (*Downhole Separation Technologies: Is it Applicable for Your Operations*, *Exploring and developing Naturally Fractured Low-Permeability Gas Reservoirs from the Rocky Mountains to the Austin Chalk*, and *Software Program Applications*) were held. The conference agenda included an opening plenary session, three platform sessions (Sessions 2 and 3 were split into 2 concurrent topics), and a poster presentation reception. The platform session topics were *Converting Your Resources Into Reserves* (Sessions 1 and 2A), *Clarifying Your Subsurface Vision* (Session 2B), and *High Performance, Cost Effective Drilling, Completion, Stimulation Technologies* (Session 3B). In total, there were 5 opening speakers, 30 presenters, and 16 poster presentations.

The papers and presentations in this document were produced primarily from electronic files provided by the authors. They have been neither refereed nor extensively edited. The conference Proceedings was provided to participants on a CD-ROM. The papers and presentations are also available on the FETC home page at <http://www.fetc.doe.gov> (see Publications).

We acknowledge the Session Chairs for their help in making this conference a success: Opening Session — Philip D. Vasquez; Session 1 — Dan Ferguson and Thomas H. Mroz; Session 2A — Patrick Lowry, Dan Ferguson, and Thomas H. Mroz; Session 2B — Robert Lemmon and William J. Gwilliam; Session 3A — Rhonda P. Lindsey and Charles A. Komar; and Session 3B — Cindy A. Reece, Jim Barnes, and Roy Long.

We thank the following NPTO and FETC employees for their help in preparation for the conference and production of this proceedings: Mike Antkowsky, Brian Albin, Helen Bresson, Joe Clevenger, Marty Dombrowski, Sarah Forbes, Mike Gray, Bill Kawecki, Kate Lessing, Carolyn Moore, Betty Robey, Chris Roe, Carla Santee, Pam Stanley, Terry Summers, Chuck White, and N. Marlene Williams.

Conference Coordinator

Kimberly Yavorsky

Conference Technical Contacts

William J. Gwilliam, FETC

Betty Felber, NPTO

Pre-Conference Workshops

This primary contents page has been set up with each session title linked to the corresponding session. To use this feature, move your cursor to the session you wish to view. (Your cursor will change to a pointing finger.) Click your left mouse button to jump to the beginning of that session.

Downhole Separation Technologies: Is It Applicable For Your Operations?
Feasibility Evaluation of Downhole Oil/Water Separator (DOWS) Technology;
John A. Veil, Bruce G. Langhus, and Stan Belieu

Exploring and Developing Naturally Fractured Low-Permeability Gas Reservoirs
from the Rocky Mountains to the Austin Chalk Workshop

Software Program Applications Workshop

Opening Session

This session contents page has been set up with each presentation title linked to the corresponding presentation. To use this feature, move your cursor to the presentation you wish to view. (Your cursor will change to a pointing finger.) Click your left mouse button to jump to the beginning of that presentation.

Welcome; Robert W. Gee — Assistant Secretary, Fossil Energy U.S. Department of Energy

Techinomics; Edward J. Di Paolo — Senior Vice President, Global Business Development Halliburton Energy Services and Brown & Root Energy Services

Technology is Key to Establishing a Competitive Advantage; Leo A. Schrider — Senior Vice President, Belden & Blake Corporation; Board of Directors Chairman, Petroleum Technology Transfer Council

DOE Natural Gas Program; Rita A. Bajura — Director, Federal Energy Technology Center, U.S. Department of Energy

Successes and Challenges for the Oil Program; William F. Lawson — Director, National Petroleum Technology Office, U.S. Department of Energy

Session 1 — Converting Your Resources Into Reserves

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- (1.1) *A Resource Development Manual for Secondary Gas Recovery in Conventional-Permeability Sandstone Reservoirs*; Robert J. Finley — Bureau of Economic Geology, The University of Texas at Austin
- (1.2) *A Small Independent Producer's Design, Construction and Operation of a Flue Gas Injection Project East Edna Field, Okmulgee County, Oklahoma*; John Godwin — Driver Production, Inc.; and David Olsen — International Centre for Heavy Hydrocarbons
- (1.3) *Air Injection in a Gulf Coast Light Oil Field*; Ken Haley — BP-Amoco
- (1.4) *Overview of the CO₂ Pilot in the Spraberry Trend Area*; David S. Schechter — New Mexico Petroleum Recovery Research Center; and Todd M. Yocham — Pioneer Natural Resources USA, Inc.

Session 2A — Converting Your Resources Into Reserves

This session contents page has been set up with each paper title linked to the corresponding paper. To use this feature, move your cursor to the paper you wish to view. (Your cursor will change to a pointing finger.) Click your left mouse button to jump to the beginning of that paper.

- (2A.1) *Sizing Gelant Treatments in Hydraulically Fractured Production Wells*; Randy Seright, Jenn-Tai Liang — New Mexico Petroleum Recovery Research Center; and Mailin Seldal — Saga Petroleum a.s.
- (2A.2) *Increasing Production and Profitability by Use of a Computer Monitoring Program*; Jerry James and Gene Huck — James Engineering, Inc.
- (2A.3) *Improved Oil Recovery in Fluvial Dominated Deltaic Reservoirs of Kansas — Near-Term*; Rodney R. Reynolds, Don W. Green, G. Paul Wilhite, Michael J. Michnick, and Dwayne McCune — Kansas Geological Survey, University of Kansas
- (2A.4) *Increased Oil Production and Reserves Utilizing Secondary/Tertiary Recovery Techniques on Small Reservoirs in the Paradox Basin, Utah*; Thomas C. Chidsey, Jr. and Craig D. Morgan — Utah Geological Survey
- (2A.5) *Cost-Effective Techniques for Improved Oil Recovery in Mississippian Carbonate Reservoirs of Kansas — Near Term — Class 2*; Timothy R. Carr, S. Bhattacharya, A. Byrnes, E. Franseen, P. Gerlach, W. Guy, and L. Watney — Kansas Geological Survey, University of Kansas
- (2A.6) *MEOR — A Low Cost Solution for Enhanced Waterflood Performance*; James O. Stephens — Hughes Eastern Corporation; Lewis R. Brown and Alex A. Vadie — Mississippi State University

Session 2B — Clarifying Your Subsurface Vision

This session contents page has been set up with each paper title linked to the corresponding paper. To use this feature, move your cursor to the paper you wish to view. (Your cursor will change to a pointing finger.) Click your left mouse button to jump to the beginning of that paper.

- (2B.1)** *Studies of Natural Gas Resources in Deep Sedimentary Basins*; Thaddeus S. Dyman, James W. Schmoker, Vito F. Nuccio, Robert A. Crovelli, Timothy C. Hester, Ronald C. Johnson, Michael L. Lewan, Christopher J. Schenk, Kenneth Takahashi, Dennis B. Riggins, Troy A. Cook, and Allison A. Henry — U.S. Geological Survey
- (2B.2)** *Discrete Feature Network Methods for IOR in Heterogeneous Reservoirs*; William Dershowitz, T. Cladouhos, P. LaPointe, and E. Wadleigh — Golder Associates, Inc.
- (2B.3)** *Analysis of Rift Basins for Optimum Development: Mississippi Interior Salt Basin*; Ernest A. Mancini, William C. Parcell, and T. Markham Puckett — University of Alabama
- (2B.4)** *Basin-Scale Mapping and Visualization of Dolomite “Chimneys” in the Michigan Basin*; James R. Wood and William B. Harrison — Michigan Technological University
- (2B.5)** *New Techniques for Using Old Geophysical Logs in Reservoir Characterization: Examples from Bell Canyon Sandstones, Ford Geraldine and East Ford Units, Delaware Basin, Texas*; Shirley P. Dutton — Bureau of Economic Geology, The University of Texas at Austin; George B. Asquith — Department of Geosciences, Texas Tech University; William A. Flanders — Transpetco Engineering of the Southwest, Inc.; Jose I. Guzman and Helena H. Zirczy — Bureau of Economic Geology, The University of Texas at Austin
- (2B.6)** *Application of a New Exploration Strategy for Unconventional Basin Center Hydrocarbon Accumulations in the Riverton Dome Area*; Ronald C. Surdam, Z.S. Jiao, and N.G.K. Boyd — Institute for Energy Research, University of Wyoming

Poster Presentations

This session contents page has been set up with each poster title linked to the corresponding poster. To use this feature, move your cursor to the poster you wish to view. (Your cursor will change to a pointing finger.) Click your left mouse button to jump to the beginning of that poster.

- (P.1) *The Use of Advanced Acoustic Cavitation for Applications in the Oil and Natural Gas Industry*; Robert W. Peters, Michael L. Wilkey — Argonne National laboratory; and James C. Furness, Jr. — Furness-Newburge, Inc.
- (P.2) *Ruggedized Optical Fiber Sensors for Downhole Monitoring*; Russell G. May, Anbo Wang, Hai Xiao, and Jiangdong Deng — Bradley Department of Electrical and Computer Engineering, Virginia Polytechnic Institute
- (P.3) *Electrical Resistance Tomography Using Steel Cased Boreholes as Long Electrodes*; Robin L. Newmark, William D. Daily, and Abelardo L. Ramirez — Lawrence Livermore National Laboratory
- (P.4) *Microhole Drilling and Instrumentation*; James N. Albright and Donald S. Dressen — Los Alamos National Laboratory
- (P.5) *Advances in Crosswell Electromagnetics: Steel Cased Boreholes*; Barry A. Kirkendall and Phillip E. Harben — Lawrence Livermore National Laboratory
- (P.6) *Design and Development of Gas Liquid Cylindrical Cyclone Compact Separators for Three-Phase Flow*; Ram S. Mohan and Ovadia Shoham — University of Tulsa
- (P.7) *Performance Characteristics of an Extended Throat Flow Nozzle for the Measurement of High Void Fraction Multi-Phase Flows*; Richard Rice, J.R. Fincke, C.L. Jeffery — Idaho National Engineering and Environmental Laboratory; C.C. Ronnenkamp, D. Kruse, J. Krogue, and D. Householder — Perry Equipment Company
- (P.8) *Large Downhole Seismic Sensor Array*; J.R. Fincke, P.B. West, D.M. Weinberg — Idaho National Engineering and Environmental laboratory; and L.A. Walter — Geospace Instruments
- (P.9) *Biological Oxidation of Sulfides in Oilfield Brines*; Greg A. Bala — Idaho National Engineering and Environmental Laboratory; G.E. Jennema — Phillips Petroleum Company; and K.L. Sublette — Center for Environmental Research and Technology, University of Tulsa

Poster Presentations (Continued)

This session contents page has been set up with each poster title linked to the corresponding poster. To use this feature, move your cursor to the poster you wish to view. (Your cursor will change to a pointing finger.) Click your left mouse button to jump to the beginning of that poster.

- (P.10) *Suction Pulse Drilling System*; Jack J. Kollé and Mark M. Marvin — Tempres Technologies, Inc.
- (P.11) *Development of an Advanced Cuttings Transport Facility and Optimization of Wellbore Hydraulics at Elevated Temperatures and Pressures*; Ergun Kuru, Stefan Miska, Nicholas Takach, and Mark Pickell — University of Tulsa
- (P.12) *Interpretation of Deep Complex Structure in a Limited-Quality 3-D Seismic Image*; Bob A. Hardage — Bureau of Economic Geology, The University of Texas at Austin
- (P.13) *Seismic Data Acquisition Through Tubing*; Michael Buettner — Lawrence Livermore National Laboratory; and Michael Jervis — Tomoseis
- (P.14) *Application of High Resolution Seismic Imaging Methods for Fracture Quantification*; Ernest L. Majer, T.M. Daley, L.R. Myer, K. Nihi, M. Feighner, J.E. Peterson, V. Korneev — Lawrence Berkeley National Laboratory; J. Queen, D. Cox — Conoco, Inc.; and T. Mroz — Federal Energy Technology Center
- (P.15) *Bed-Isolation Treatments of a Mature Well in the Bluebell Field of the Uinta Basin, Utah, That Has Undergone Numerous High-Volume Shotgun Completions*; Craig D. Morgan — Utah Geological Survey; and Milind D. Deo — University of Utah
- (P.16) *Greater Green River Basin Production Improvement Project, Rock Island 4-H, Table Rock Field, Frontier Formation*; Frank H. Lim — Union Pacific Resources

Session 3A — Converting Your Resources Into Reserves

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- (3A.1) *Low Cost Methods for Finding Tight Gas, Gas Shales and Coalbed Methane*; Vello A. Kuuskraa and David J. Campagna — Advanced Resources International, Inc.
- (3A.2) *Optimization of Infill Drilling in Naturally-Fractured Tight-Gas Reservoirs in the San Juan Basin*; Lawrence W. Teufel — New Mexico Institute of Mining and Technology
- (3A.3) *Major Pennsylvanian Fluvial-Dominated Deltaic Reservoir Systems in Oklahoma*; Jock A. Campbell, Richard A. Andrews — Oklahoma Geological Survey; Robert A. Northcutt — Independent Geologist; Roy M. Knapp and Mary K. Banken — University of Oklahoma
- (3A.4) *Incorporating Seismic Attribute Modeling into a Flow Model of the Grayburg Reservoir in the Foster-South Cowden Field*; Robert C. Trentham, Richard M. Weinbrandt, and William C. Robinson — Laguna Petroleum Corporation
- (3A.5) *Multi-Disciplinary and High-Resolution Seismic Survey on Native American Lands in Osage County, Oklahoma*; T. K. Reeves, Bijon Sharma, Sanjay Banerjee, Genliang Guo, Len Volk, David Djikine, and Steve George — Formerly of TRW Petroleum Technologies
- (3A.6) *Integrated Approach Towards the Application of Horizontal Wells to Improve Waterflooding Performance*; Mohan Kelkar — University of Tulsa
- (3A.7) *Advanced Oil Recovery Technologies for Improved Recovery from Slope Basin Clastic Reservoirs*; Bill Weiss — Strata Production Company

Session 3B — High Performance, Cost Effective Drilling, Completion, Stimulation Technologies

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- (3B.1)** *Advanced Fracturing Technologies for Marginal Oil and Gas Wells*; Scott R. Reeves — Advanced Resources International
- (3B.2)** *A Well Completion Technique for Controlling Unconsolidated Sand Formations by Using Steam*; Philip Scott Hara — Tidelands; Oil Production Company; Julius J. Mondragon III — University of Southern California; and David K. Davies — David K. Davies and Associates, Inc.
- (3B.3)** *Coiled-Tubing High-Pressure Jet Drilling System*; William C. Maurer, Curtis E. Leitko, and C. Mel Hightower — Maurer Engineering, Inc.
- (3B.4)** *High-Power Drilling Motor Field Tests*; John H. Cohen, Curtis E. Leitko, and William C. Maurer — Maurer Engineering, Inc.
- (3B.5)** *Advanced Mud Hammer Systems*; David S. Pixton and D. Hall — Novatek, Inc.
- (3B.6)** *New High Strength and Faster Drilling TSP Diamond Cutters*; Robert P. Radtke — Technology International, Inc.
- (3B.7)** *New Lightweight Fluid for Underbalanced Drilling*; William J. McDonald, John H. Cohen, and C. Mel Hightower — Maurer Engineering, Inc.